DIRECTIONS

Evaluate the student by checking the appropriate box to indicate the degree of competency. The rating for each competency should reflect **employability readiness** rather than the grades given in class.

Rating Scale:
0 No Exposure
1 Introduced – The student has been exposed through non-participation instruction (e. g., lecture, demonstration, field trip, video).
2 Practiced – The student can perform the task with direct supervision.
3 Entry-level Competency – The student can perform the task with limited supervision and/or does not perform the task to standard (a typical entry-level performance expectation)
4 Competency – The student consistently performs task to standard with no supervision (on at least two occasions or at instructor's option)

ENGINEERING TECHNICIAN 15.0000

CADD

0 1 2 3 4

θθθθθ **A. WORK PLACE BEHAVIORS**

*A.001 Maintain an acceptable attendance record.
*A.002 Work well independently, showing pride and interest in work assignments.
*A.003 Demonstrate aptitude for creativity.
*A.004 Plan and perform work accurately, neatly and efficiently.
*A.005 Show personal growth as a worker, evaluating own work.
*A.006 Follow directions from supervisors and are willing to ask questions for clarification.
*A.007 Develop good oral and written communication skills.
*A.008 Cooperate with co-workers and supervisors.
*A.009 Demonstrate teamwork as a contributing team member.
*A.010 Develop personal career goals.
*A.011 Demonstrates positive attitude toward work.

θθθθθ **B. SAFETY**

*B.001 Understands and applies safety requirements of the work place.
*B.002 Recognizes any unsafe working conditions and reports them to the supervisor, understanding ethical and safety issues involved.
*B.003 Follows proper hazardous material handling and disposal procedures, according to state and federal regulations.

θθθθθ **C. BASIC BOARD DRAFTING**

*C.001 Explain the use and care of basic drafting equipment.
*C.002 Become familiar with the various scales used in drafting.
*C.003 Identify types and sizes of drawing media.
*C.004 Identify all drafting tools and equipment.
*C.005 Know how to locate and use reference and resource materials.
*C.006 Utilize reference materials, etc.
*C.007 Draw light guidelines, and freehand single stroke Gothic letters.
*C.008 Utilizes proper line techniques on drawings.
*C.009 Identify the Alphabet of Lines and its uses.
*C.010 Understands the process used for the reproduction of original drawings.
*C.011 Apply basic computation skills to solve mathematical problems.
*C.012 Apply basic measurement skills.
*C.013 Apply basic geometry and trigonometric skills to solve problems.

θθθθθ **D. DRAWING CONVENTIONS**

*D.001 Apply basic freehand sketching techniques.
*D.002 Estimates proportions using proper sketching techniques.
*D.003 Visualize and sketch objects using multi-view projection.
*D.004 Visualize and sketch objects using orthographic projections theory.
*D.005 Visualize and sketch objects isometrically.
*D.006 Selects and positions views accurately.
*D.007 Constructs orthographic drawings from dimensioned problems.
*D.008 Constructs isometric and oblique pictorial drawings.
*D.009 Visualize, locate and draw 2 view and 3 view drafting problems using drafting standards.
*D.010 Transfer points and sizes between views by projection.
*D.011 Locate and draw all lines required for accurate presentation.
*D.012 Describe basic dimensioning rules.
*D.013 List and define terms, kinds of lines, procedures associated with basic dimensioning.
*D.014 Neatly letter characters, numbers and fractions using guidelines.
*D.015 Apply size and location dimensions to any basic drawing.
*D.016 Utilizes basic dimensioning techniques properly.
*D.017 Define common drafting related geometric terms.
*D.018 Apply basic geometric construction techniques.
*D.019 Apply dual dimensioning procedures using SI metrics.
*D.020 Apply basic tolerancing (international) standards. (Y14.5)
*D.021 Use photocopy, cut and paste and other graphic techniques to enhance the drawing process.

θθθθθ **E. CADD**

*E.001 Identify the parts/components of a CADD system.
*E.002 Be familiar with MS DOS computer software systems operations.
*E.003 Assign drawings to a floppy disk.
*E.004 Be familiar with 2-D concept of CADD.
*E.005 Select appropriate commands from the AutoCADD pull down menu system.
*E.006 Create basic 2-D entities (lines, circle, arcs, points, text, etc.)
*E.007 Understand the Cartesian coordinate system.
*E.008 Know how to generate entities using absolute, relative and polar coordinates.
*E.009 Apply appropriate editing features.
*E.010 Choose appropriate object snap method for connecting entities.
*E.011 Understand how to assign entities to different layers.
*E.012 Assign appropriate line types.
*E.013 Dimension entities.
*E.014 Plot a drawing.
*E.015 Generate an orthographic projection of a given object.
*E.016 Use verification and measurement procedures.
*E.017 Construct and use libraries.
*E.018 Be familiar with 3-D concept of CADD.

θθθθθ **F. ARCHITECTURAL DRAWING**

*F.001 Identify various architectural styles.
*F.002 Properly locate house on and draw site plans.
*F.003 Properly layout and draw residential floor plans.
*F.004 Properly draw elevation views.
*F.005 Dimension architectural drawings as necessary.
*F.006 Construct 3 dimensional model of house.

θθθθθ **G. MECHANICAL DRAWING**

*G.001 Draws various threads and fasteners.
*G.002 Draws cams.
*G.003 Draws springs.
*G.004 Draws gears.
*G.005 Draws detail drawings.
*G.006 Draws assemble drawings.

*G.007 Depicts shop processes in working drawings (casting, welds, etc.).
*G.008 Calculates tolerance limits and applies them to drawings.
*G.009 Demonstrates advanced dimensioning techniques (holes, tolerancing, etc.).

θθθθθ **H. PERSONAL AND PROFESSIONAL DEVELOPMENT**

*H.001 Demonstrate self-confidence.
*H.002 Practice common courtesies.
*H.003 Work well with others.
*H.004 Follow instructions.
*H.005 Demonstrate attendance responsibilities.
*H.006 Demonstrate good health habits and grooming.
*H.007 Demonstrate effective verbal communication.
*H.008 Demonstrate effective written communication.
*H.009 Exhibit good safety habits.
*H.010 Seek and recognize work to be done.
*H.011 Respect facilities.
*H.012 Demonstrate pride in work.
*H.013 Demonstrate problem solving ability.
*H.014 Respect authority.
*H.015 See job through from beginning to end.
*H.016 Readily accept a challenge.
*H.017 Listen attentively.

PRINCIPLES OF TECHNOLOGY AND MATHEMATICS

θθθθθ **A. FORCE, WORK, RATE, AND RESISTANCE IN MECHANICAL SYSTEMS**

θθθθθ **B. PRESSURE, WORK, RATE, AND RESISTANCE IN FLUID SYSTEMS**

θθθθθ **C. VOLTAGE, WORK, RATE, AND RESISTANCE IN ELECTRICAL SYSTEMS**

θθθθθ **D. TEMPERATURE, RATE, AND RESISTANCE IN THERMAL SYSTEMS**

θθθθθ **E. TECHNICAL MATHEMATICS**

MANUFACTURING TECHNOLOGY

θθθθθ **A. INDUSTRIAL SAFETY**

*A.001 Demonstrate knowledge of VOSHA.
*A.002 Explain fire drill and accident/injury procedures.
*A.003 Demonstrate knowledge of laboratory safety rules and regulations.
*A.004 Explain the student's responsibility toward creating a safe classroom environment.
*A.005 Observe safety practices in local industry. (field trips, shadowing, apprenticeship)
*A.006 Pass a safety test with 100% accuracy. (testing equipment)
*A.007 Identify materials using code systems. EXAMPLE: AISI and SAE codes

θθθθθ **B. SCHOOL TO WORK**

*B.001 Trace the development of manufacturing from the Stone Age to present.
*B.002 Define the term "Mass Production".
*B.003 Explain the relationship of mass production to the national economy.
*B.004 List four natural resources and how each is obtained.
*B.005 Identify four natural energy resources.
*B.006 List four natural materials used in manufacturing.
*B.007 List two synthetic materials used in manufacturing.

*B.008 Produce a portfolio consisting of: Resume, documentation of program accomplishments, a sample of work, school transcripts, attendance records, awards and recognition and teacher evaluation/recommendation.
*B.009 Participate in a work cooperative, externship or apprenticeship program.

θθθθθ **C. ATTENDANCE, POSITIVE ATTITUDE, AND WILLINGNESS TO LEARN**

θθθθθ **D. TEAM MEMBER ATTRIBUTES**

θθθθθ **E. INTERPRET AND WORK FROM DRAWINGS AND SPECIFICATIONS**

*E.001 Transfer measurements from the print to the workpiece.
*E.002 Observe operation of a coordinate measuring machine. (field trip)
*E.003 Observe operation of an optical comparator. (field trip)

θθθθθ **F. SET-UP AND OPERATE CONVENTIONAL MACHINE TOOLS (work to within specified tolerances)**

*F.001 Demonstrate knowledge of the use and application of the following tools: steel rules, rule depth gauge, combination set, steel square, center guage, screw pitch guage, small hole gauge, micrometers and telescoping gauges, dial indicating gauges, gauge blocks, go, no go guages and radius gauges.
*F.002 Select the correct tooling for various types of measurement and layout work.
*F.003 Define specific milling machine terms.
*F.004 Demonstrate knowledge of the differences among types of end milling cutters.
*F.005 Demonstrate knowledge of the concept of backlash.
*F.006 Demonstrate conventional and climb milling and the uses of each.
*F.007 Demonstrate an understanding of machine vibrations and how to eliminate them.
*F.008 Select and install the proper tooling for a milling machine application.
*F.009 Inspect the machine tool for safe working order and report unsafe conditions to the instructor.
*F.010 Calculate and set speeds and feeds.
*F.011 Demonstrate tramming the head and squaring the vise.
*F.012 Perform Operations: plain and face, conventional and climb.
*F.013 Machine a flat surface.
*F.014 Machine a workpiece square.
*F.015 Perform operations on a dividing head.
*F.016 Perform operations on a rotary table.
*F.017 Machine grooves and keyways.
*F.018 Perform drilling, reaming and boring operations.
*F.019 Perform cut-off operation. (slitting saw)
*F.020 Machine a flat surface using a fly cutter.
*F.021 Machine products to specified tolerances.
*F.022 Set-up gear train for dividing head to perform cam and gear cutting operations.
*F.023 Demonstrate knowledge of jig boring procedures.
*F.024 Define specific fastener terms.
*F.025 Demonstrate methods of fastening methods.
*F.026 Identify various types of fasteners.
*F.027 Selection fasteners for a specific application.

θθθθθ **G. BASIC KNOWLEDGE OF METALLURGY**

*G.001 Define specific metal and alloy terminology.
*G.002 Explain the difference between thermoplastic and thermosetting plastic.
*G.003 Select a material for a specific application and defend that selection.
*G.004 Explain the procedures for performing the following tests on metallic materials: (strength, hardness, brittleness, toughness, and tensile strength).
*G.005 Explain how wood products are manufactured.

θθθθθ **H. APPLY MATH (Decimals, Fractions, Algebra, Geometry, and Trigonometry) to Related Problem Solving Processes**

*H.001 Demonstrate basic knowledge of the history of measurement systems.
*H.002 Measure diameters, thicknesses, depths, and angles within stated tolerances.
*H.003 Demonstrate proficiency in calculations using whole numbers, fractional and decimal operations.
*H.004 Demonstrate proficiency in technical application of calculations in angular and linear problems.
*H.005 Apply mathematical formulas, reference books (Machinist's Handbook, etc.) and reference charts used in Machine Tech.
*H.006 Estimate job cost in time and materials.
*H.007 Use SINE bar and SINE plate in combination with gauge blocks to check angles to within minutes of arc.
*H.008 Observe application of Statistical Process Control (SPC) procedures in a manufacturing setting. (field trip)
*H.009 Define ISO.
*H.010 Demonstrate knowledge of ISO 9000 and it's impact on manufacturing.
*H.011 How does ISO 9000 effect manufacturing globally.
*H.012 Define the term Statistical Process Control.
*H.013 Demonstrate knowledge of SPC and how it is applied to manufacturing.
*H.014 Demonstrate knowledge and use of control charts.

θθθθθ **I. BASIC KNOWLEDGE OF COMPUTER NUMERIC CONTROL (CNC), PLASTICS TECHNOLOGY, AND HYDRAULICS/PNEUMATICS**

*I.001 Demonstrate knowledge of how water and air have historically been used for mechanical power transmission.
*I.002 Describe how hydraulic and pneumatic systems are used in area such as construction, manufacturing, and transportation.
*I.003 Connect, apply and test a hydraulic system in a laboratory based activity.
*I.004 Connect, apply and test a pneumatic system in a laboratory based activity.
*I.005 Explain how electro-mechanical devices are used in manufacturing.

θθθθθ **J. DEMONSTRATE KNOWLEDGE OF LEADERSHIP SKILLS OFFERED THROUGH SKILLS USA-VICA**

*J.001 Complete 2 steps of the Professional Development Program, Vocational Industrial Clubs of America, (VICA).
*J.002 Become affiliated with a National Youth Organization (VICA).

θθθθθ **K. JOB ENTRY SKILLS**

θθθθθ **L. KNOWLEDGE OF POST-HIGH SCHOOL EDUCATION AND TRAINING OPTIONS**